



PATENT SPECIFICATION

722,781

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COMPLETE SPECIFICATION

Improvements in or relating to Pendent Superheaters

We, **BABCOCK & WILCOX LIMITED**, a British Company, of Babcock House, Farringdon Street, London, E.C.4, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a pendent superheater arranged in a gas pass below a roof provided with roof tubes.

Hitherto the tubes of such a pendent superheater have been located by supporting means which connect with upper return bends of the superheater tubes and which extend through the roof of the gas pass and between the roof tubes. Alternatively, the superheater tubes have been extended upwardly between the roof tubes so that upper bends thereof are located above the roof. In either case the roof has to be perforated in a great many places and because of the heat expansion, in the one case of the supporting means and in the other case of the parts of the superheater tubes passing through the roof, it is very difficult successfully to lag the perforations. In addition the shapes of the bricks forming the roof are complicated by the perforations and the many supports required by the superheater tubes tend to hinder proper movement of the roof.

The present invention includes a pendent superheater arranged in a gas pass below a roof provided with roof tubes and comprising a plurality of sinuous tubes each having at least one upper return bend, wherein the axes of the superheater tubes lie substantially in upright planes which pass through the axes of roof tubes and the superheater tubes are respectively supported by the said roof tubes through welded connections at the upper return bends thereof.

The invention also includes a sinuous superheater tube comprising a main part including at least one upper return bend joined by a welded connection to an adjacent section of tube adapted to lie, at least partly, along the roof of a gas pass, pendent to support the superheater tube and to be welded at site into its operative position, and end parts extending past the sec-

tion of roof tube away from the main part which is disposed with its axis in or substantially in a plane containing the axis of the section of roof tube.

An advantage of the invention is that only the supporting means for the roof tubes pass through the roof and these may be made stronger than hitherto in order to carry the extra load which results from the fixing of the superheater tubes to the roof tubes. Because only a few supports extend through the roof, the space above the roof is readily accessible and repairs to the roof can therefore be more easily carried out.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

Figure 1 is a partly diagrammatic, longitudinal section through a portion of a gas pass of a steam generating and superheating unit, which pass extends between an upper part of a radiant portion of the unit and the inlet to a downflow pass and contains a pendent superheater;

Figure 2 is a view to an enlarged scale of part of Figure 1 and shows details of the superheater supporting means; and

Figure 3 is a transverse sectional view taken on the line III—III of Figure 2.

The drawings illustrate a secondary superheater formed as a pendent superheater and comprising groups of tubes 1 and 2 which extend in parallel sinuous paths between an inlet header 3 and an outlet header 4 and are disposed substantially within a gas pass 14. The tubes 1 and 2 of any particular group lie in nested formation, the path of the tube 1 extending below that of the tube 2 and the axes of the tubes lying in a vertical plane which contains the axis of a longitudinally extending roof tube 5. The tubes 5 which support the roof of the gas pass 14 supply steam to a primary superheater (not shown) and extend from a boiler drum 11 which is arranged above inclined parts of vaporizing tubes 12 which carry the roof of a radiant portion 13 of the unit.

The upper bends of the tube 2 of each group are weld united with the lower surfaces of connecting pieces 6 of which the upper surfaces are weld united with the cor-

responding roof tube 5. The upper bends of each tube 1 are similarly fixed to the upper bends of the corresponding coplanar tube 2 by means of connecting pieces 7.

5 The connecting pieces 6 and 7 need not be of special steel since the dimensions of these pieces are small and adequate cooling is thereby ensured.

The roof tubes 5 are connected to an upper, roof supporting framework (not shown) by means of suspension plates 8, of which the lower edges are welded to the roof tubes 5, and links 9 which extend between the plates 8 and the upper framework. The roof includes longitudinally extending rows 10 of uniformly shaped bricks, lower longitudinal edges of which rest on the tubes 5. The provision of the connecting pieces 6 and 7 avoids the use of apertured roof bricks.

20 The bricks of the rows 10 are therefore of simple design and their use improves the insulating qualities of the roof.

In order to simplify erection of the unit, butt welds are made at points 15 and 16 in the roof tubes and at points 17 and 18 in the superheater tubes so that the tubes 1 and 2 and adjacent sections of the roof tubes 5 can be fabricated in the workshop by welding in the connecting pieces 6 and 7. The ends of the roof tube sections adjacent the tubes 1 and 2 are so formed as to facilitate the formation of the butt welds 15 and 16 whilst the ends of the tubes 1 and 2 are so formed as to facilitate the formation of the butt welds 17 and 18. It will be understood that the primary superheater may be supplied by tubes other than the tubes 5, in which case the tubes 5 could be boiler or economiser tubes.

What we claim is:—

1. A pendent superheater arranged in a gas pass below a roof provided with roof tubes and comprising a plurality of sinuous tubes each having at least one upper return bend, wherein the axes of the superheater tubes lie substantially in upright planes which pass through the axes of roof tubes and the superheater tubes are respectively supported by the said roof tubes through welded connections at the upper return bends thereof.

2. A pendent superheater as claimed in Claim 1, comprising tubes in nested formation, wherein upper adjacent nested return bends are joined through welded connections.

3. A pendent superheater as claimed in Claim 1 or Claim 2, wherein the roof tubes include suspension plates extending between bricks supported by the roof tubes.

4. A sinuous superheater tube comprising a main part including at least one upper return bend joined by a welded connection to an adjacent section of tube adapted to lie, at least partly, along the roof of a gas pass, pendently to support the superheater tube and to be welded at site into its operative position, and end parts extending past the section of roof tube away from the main part which is disposed with its axis in or substantially in a plane containing the axis of the section of roof tube.

5. A pendent superheater arranged substantially as hereinbefore described with reference to the accompanying drawings.

For the Applicants,

A. C. PRICE,

Chartered Patent Agent.

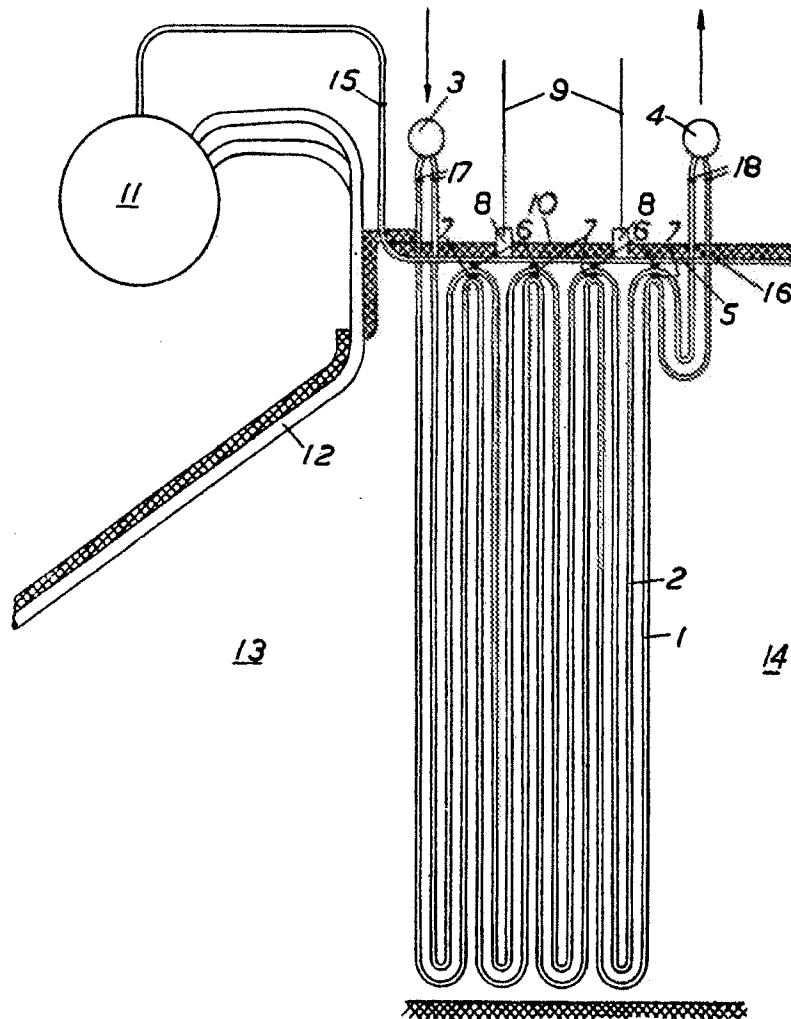
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2 SHEETS

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SHEET 1

FIG. 1.



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SHEET 2

FIG. 2.

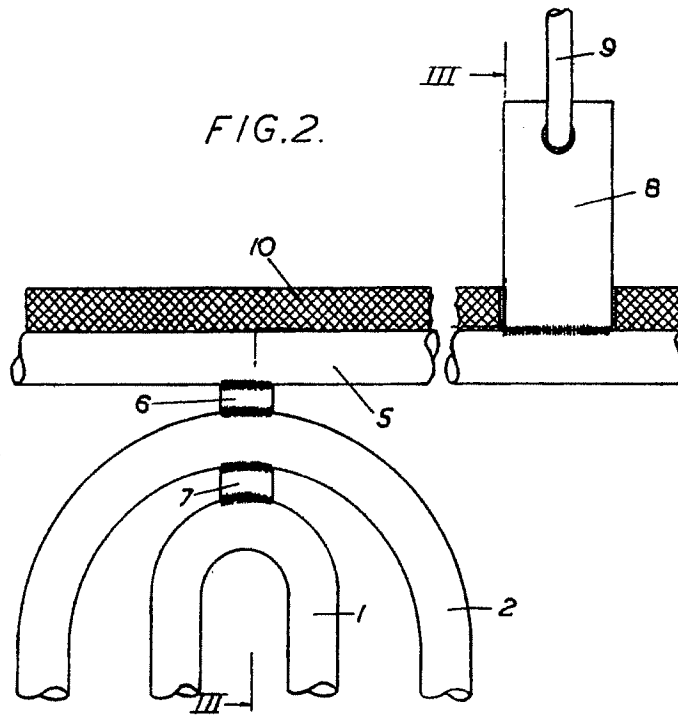


FIG. 3.

